Claims

1. A peptide comprising SEQ ID N° 1 and no more than 10 amino acids preferably, inducing attraction of the axonal growth, in particular in presence of the semaphorin (Sema3A, L1 and NP-1 proteins.

2. The peptide of claim 1 consisting of SEQ ID N° 1.

3. The peptide of claim 1, comprising or consisting of SEQ ID N° 2.

4. The peptide of claim 1, consisting of SEQ ID N° 3.

5. An inducer of axonal growth consisting of the peptide of anyone of claims 1 to 4.

6. A method for identifying a compound able to bind the NP-1 protein, comprising the steps of:

a) contacting said compound with a sample comprising the NP-1 protein, before, after or concomitantly with contacting said sample with the L1-Fc protein or the peptide of any of claims 1 to 4,

b) studying the binding between NP-1 and L1-Fc or said peptide,

the binding of said compound to the NP-1 protein being deduced from the alteration of the binding of NP-1 with L1-Fc or said peptide observed in absence of said compound.

7. The method of claim 6, wherein said sample also comprises the L1 protein.

8. The method of claim 6 or 7, wherein said NP-1 protein is a recombinant protein.

9. The method of anyone of claims 6 to 8, wherein said sample comprises a cell expressing the NP-1 protein at its surface.

10. The method of any of claims 6 to 9, wherein said sample comprises a cell expressing the NP-1 and L1 proteins at its surface.

11. The method of claim any of claims 6 to 10, wherein said L1-Fc protein or said peptide is labeled and said binding of NP-1 protein with said L1-Fc protein or said peptide is assayed by level of signal associated with said NP-1 protein.

12. The method of any of claims 6 to 11, wherein said alteration of binding of NP-1 with L1-Fc or said peptide is assayed by measuring a secondary signal appearing in the presence of said binding.

13. The method of claim 12, wherein said secondary signal is induced in the presence of Sema3A.

14. The method of claim 13, wherein said secondary signal is the reversion of the repulsory effect of Sema3A on axonal growth.

15. The method of claim 13, wherein said secondary signal is the activation of NO synthesis.

16. The method of claim 13, wherein said secondary signal is an increased production of cGMP.

17. A method for attracting /modulating the direction of axonal growth by a cell suited to promote axonal growth, submitted to a Sema3A flow, comprising the step of contacting said cell to the peptide of any of claims 1 to 4, or the inducer of claim 5.

18. A method for identifying a compound able to revert the repulsory effect of Sema3A on the axonal growth from a suited cell, comprising the steps of contacting said cell expressing L1 and NP-1 at its surface with said compound in the presence of Sema3A, and studying the increase in NO synthesis in said cell.

19. A method to screen for molecules that prevent the internalization of the dextran induced by the Sema3A treatment or to screen for molecules capable of blocking Sema3A- induced endocytosis by cells, characterized in that said method comprises the following steps of:

a) culturing cells expressing L1 and NP-1 in the presence of Sema3A, a labelled dextran and the molecule to be assayed ; and

b) visualizing or determining if said labelled dextran has been internalized into the cells ;

c) selecting the assayed molecule if no uptake of the labelled dextran by the cells could be detected.

20. A method to screen for molecules capable of blocking Sema3A- induced co-internalization of L1 and NP-1 proteins, to screen molecules capable of maintaining cell surface expression of L1 and NP-1 proteins or to screen molecules capable of blocking

Sema3A- induced endocytosis, characterized in that said method comprises the following steps of:

a) culturing cells expressing L1 and NP-1 in the presence of Sema3A and the molecule to be assayed ; and

b) visualizing or determining if said L1 and NP-1 proteins have been co-internalized into the cells using an immunocytochemical method in presence of antibodies directed against L1 and NP-1 proteins ;

c) selecting the assayed molecule if L1 and NP-1 proteins could be detected at the surface of the cells.

21. Use of the peptide of anyone of claims 1 to 4, or the inducer of claim 5, for the manufacture of a drug for neuronal/axonal regeneration.

22. Use of the peptide of anyone of claims 1 to 4, or the inducer of claim 5, for the manufacture of a drug for treating neurodegenerative diseases.

23. Use of the peptide of anyone of claims 1 to 4, or the inducer of claim 5, as a targeting agent, in the manufacture of a composition to be used in cell therapy.